**SCIENTIFIC MEASURMENT AND MAPPING**

LAB REPORT – 80 pts.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Group #: \_\_\_\_\_\_\_\_

Period: \_\_\_\_\_\_\_\_

**OBJECTIVE**: To use the scientific method on a common object and interpret topographic maps.

**QUESTION:** What will happen to the dimensions of a gummy bear if soaked in water?

**HYPOTHESIS:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1 pt.)**

**MATERIALS:**

* 250 mL beaker
* Plastic pipet
* Penny
* Calculator
* Paper towels
* Colored pencils
* 1 gummy bear
* 1 glass container w/ lid
* Metric ruler
* Balance and/or scale
* Graduated cylinder w/ water
* 1 toothpick
* Piece of masking tape
* 1 lab report sheet per student

**INTRODUCTION:**

Scientists all over the world take part in some type of experimental researching every day. Along with this research comes a series of steps these scientists must follow in order to answer questions and solves problems known as the **scientific method**. While carrying out different experimental testing procedures, scientists will study factors, or **variables**, of the experiment. The two different types of variables include independent and dependent variables. The independent variable is the factor being changed during the experiment while the dependent variable is the outcome, or result being measured during the experiment. Scientists also use the modern day form of the metric system when calculating data called the **International System (SI) of Units**. In fact, 95% of the world uses this system of measurement exclusively, with one exception being the United States, who still uses the English system of measurement. Extremely large numbers and extremely small numbers can be expressed using **scientific notation**, where the focus is on the exponent of ten. There are also different mapping techniques used by scientists throughout the world, including the use of **topographic maps**, maps showing elevation.

**PROCEDURE:**

1. Observe the gummy bear placed on your lab table at your station with your group members. Use the equipment available to measure your gummy bear and record the necessary experiment data in the chart for Day 1.

• *The length of your gummy bear should be measured from the top of its head to the bottom of its feet to the nearest tenth of a centimeter.*

*• Measure the width at the widest point across the back of the bear to the nearest tenth of a centimeter.*

*• Measure the thickness from the front to the back at the thickest point to the nearest tenth of a centimeter.*

*• Calculate the volume by multiplying the length, width, and thickness. In the equation, use the gummy bear’s thickness for the height. Round your answer to the nearest hundredth.*

***Volume = length x width x height***

*• Measure the mass using a triple-beam balance or other scale to the nearest tenth of a gram.*

*• Calculate the density by dividing the mass by the volume. Round your answer to the nearest hundredth.*

***Density = mass / volume***

1. Write the last names of all group members along with your period number on the piece of masking tape at your lab station. Place this piece of tape on your glass container.
2. Stick the end of the toothpick through the gummy bear. Then, put the toothpick (with the gummy bear attached) in the glass container.
3. Add 50 ml of water to the container and allow it to sit on the storage table with the lid off. The instructor will dump the water at the end of the day and put the lid on all containers with the water-absorbed gummy bear still inside.
4. On Day 2 of the lab, remove the toothpick/gummy bear from the container and use a paper towel to dry it off to prevent dripping. Repeat the measurements from Part A and record the necessary experiment data in the chart for Day 2. Determine the amount of change for each measurement and record in the designated space.

**RESULTS AND OBSERVATIONS (10 pts.)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DAY | BEAR COLOR | LENGTH | WIDTH | THICKNESS |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| AMT. CHANGE |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| DAY | VOLUME | MASS | DENSITY |
| 1 |  |  |  |
| 2 |  |  |  |
| AMT. CHANGE |  |  |  |

Which change was greater for your group - volume or mass? Why do you think this was?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Was there a change in density? (Think of the equation for density)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How do your results compare to those of your classmates? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Now move on to the penny portion of the lab. Make an educated guess, or a hypothesis, as to how many drops of water can fit on one side of a penny: \_\_\_\_\_\_\_ drops **(1 pt.)**
2. Fill the 250 mL beaker with water.
3. Rinse the penny in tap water, then dry it completely and place on a paper towel.
4. Using the plastic pipet, place drops of water on one side of the penny (one at a time), until any amount of water runs over the edge of the penny. Record the number of drops for that trial in the table below.
5. Repeat steps 3 and 4 three more times, recording the number of drops for each trial in the appropriate spot. **(4 pts.)**
6. Calculate the average number of drops for all four trials by using your calculator along with the following equation: **(1 pt.)**

***Average # drops H2O = (T1 + T2 + T3 + T4) / 4***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Trial 1 (T1) | Trial 2 (T2) | Trial 3 (T3) | Trial 4 (T4) | Average |
|  |  |  |  |  |

1. Read the following situations and identify the independent variable, dependent variable, and the method of study (lab experiment, naturalistic observation, survey, or case study). **(3 pts. each)**
   1. A developmental psychologist is testing the hypothesis that children in first grade know more words in the English language than children in Kindergarten. To test this, she sits in on two classes (one first grade, the other Kindergarten) and counts the average number of words children in each class speak. She then compares the counts.

Independent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Type of Study: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. A clinical psychologist hypothesizes that people who have been diagnosed as having major depression will be more likely to also be diagnosed with an anxiety disorder than will people who have not been diagnosed with major depression. To test this, he gives a survey to 100 people being treated for depression and 100 people with no known mental disorder. The survey asks them to report whether or not they have been diagnosed as having an anxiety disorder.

Independent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Type of Study: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. A teacher believes that if children successfully lie to their friends, they will be more likely to try lying to their parents. To test this hypothesis, he asks 50 children to report how many times in the last month they have lied to their friends, and whether they were successful. He then asks them how many times they have lied to their parents.

Independent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Type of Study: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. A therapist hypothesizes that listening to an inspirational tape will lead one to be in a better mood. To test this, she has 50 people listen to an hour-long inspirational tape. Another 50 listen to white noise for an hour. She then has them rate their mood on a 10-point scale.

Independent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Type of Study: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Fill in the correct SI Base Unit, along with its symbol, for each of the following. **(7 pts.)**:

Length: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

Mass: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

Temperature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

Time: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

Amt. Substance: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

Electric Current: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

Light Intensity: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

**METRIC CONVERSIONS**

*Fill in the boxes in the stair step diagram.* **(1 pt.)**

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*Convert the following measurements.* **(½ pt. each)**

1000 mg = \_\_\_\_\_\_\_ g 1 L = \_\_\_\_\_\_\_ mL 160 cm = \_\_\_\_\_\_\_ mm

14 km = \_\_\_\_\_\_\_ m 109 g = \_\_\_\_\_\_\_ kg 250 m = \_\_\_\_\_\_\_ km

*Compare using <, >, or =.* **(½ pt. each)**

56 cm \_\_\_\_\_ 6 m

7 g \_\_\_\_\_ 698 mg

536 cm \_\_\_\_\_ 53.6 dm

22 dag \_\_\_\_\_ 2.2 kg

*Write the correct abbreviation for each metric unit.* **(½ pt. each)**

Kilogram \_\_\_\_\_ Milliliter \_\_\_\_\_ Kilometer \_\_\_\_\_

Meter \_\_\_\_\_ Dekagram\_\_\_\_\_ Centimeter \_\_\_\_\_

**ENGLISH 🡪 METRIC CONVERSIONS**

*Use the chart below and a calculator to convert each measurement. Round your answers to the nearest hundredth if needed.* **(½ pt. each)**



16 in = \_\_\_\_\_\_\_ cm 345 lbs = \_\_\_\_\_\_\_ kg 56 g = \_\_\_\_\_\_\_ oz

450 km = \_\_\_\_\_\_\_ mi 1200 ml = \_\_\_\_\_\_\_ fl oz 40 m = \_\_\_\_\_\_\_ ft

**DIMENSIONAL ANALYSIS PROBLEMS**

*Use dimensional analysis and any above charts to answer and solve the following problems. Make sure to show all of your and box your final answer. Round to the nearest hundredth if needed.* **(1 pt. each)**

How many seconds are in 2 years?

Express 6 inches in terms of centimeters.

If you are going 50 miles per hour (mph), how many feet per second (ft/s) are you traveling?

The pencil on the desk is 19 cm. long. How long is the pencil in inches?

Macho Man can lift 200 kg. with ease. How many pounds is this?

The distance between Freeport and Greensburg is 60 miles. How far is this in kilometers?

A can of Mountain Dew holds 355 mL of soda. How many liters would be in 2 cans of Mountain Dew?

1. Look at the topographic map feature below. Please note the number values are assigned in terms of meters (m). Color the elevations on the map as follows: **(6 pts.)**

RED 50 m. 🡪

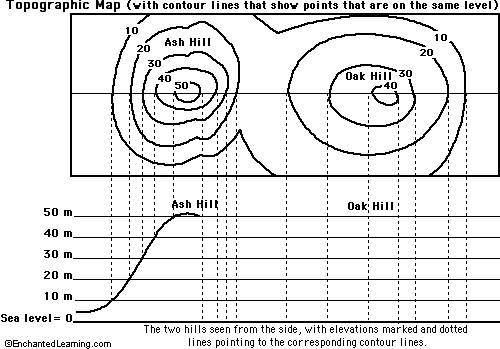
ORANGE 40-50 m.

YELLOW 30-40 m.

LIGHT GREEN 20-30 m.

DARK GREEN 10-20 m.

PURPLE 0-10 m.

[](http://www.enchantedlearning.com/geography/mapreading/)

1. Now, finish the side view mountain diagram above, completing Ash Hill and Oak Hill. **(1 pt.)** Then answer the following questions. **(6 pts.)**
   1. Approximately how tall is Ash Hill?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. Approximately how tall is Oak Hill?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. Which mountain is taller?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. How many meters of elevation are there between contour lines on the above map?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. Are the contour lines closer together on Ash Hill or Oak Hill?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. Which mountain has steeper slopes?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**LAB QUESTIONS (1 pt. each) –** *Please write your answers in* ***COMPLETE SENTENCES****!*

1. Define the scientific method, appropriately naming all steps involved.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Differentiate between the types of variables observed throughout scientific experimentation.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the International System of Units (SI) and how did it get its name?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What percentage of the world uses the International System (SI) of Units?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Why is scientific notation helpful when performing mathematical calculations?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Name three different types, or classes, of map projections used in modern-day science and navigational purposes.

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1. Describe the difference between a contour line and a contour interval.

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**CONCLUSION (5 pts.) –** *Write a solid paragraph (at least 5 sentences) about your conclusions from the lab. Discuss the steps you went through during your lab experiment, what you accomplished, and how you tested your hypothesis. Also include what you learned as a result of this lab experiment.*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_